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It remains to formally tabulate the renumeration of spinal nerves and the reconstruction of the plexuses which I recommend for adoption :

OLD STYLE.				NEW STYLE.			
Plexus, Cervical [Four]	{	N. Cervical First.	1	1. First Cervical N.	{	Cervical Plexus [Four]	
		" " Second.	2	2. Second " "			
		" " Third.	3	3. Third " "			
		" " Fourth.	4	4. Fourth " "			
Plexus, Brachial [Five]	{	" " Fifth.	5	5. Fifth " "	{	[upper cord]	
		" " Sixth.	6	6. Sixth " "			
		" " Seventh.	7	7. Seventh " "			
		" " Eighth.	8	8. First Dorsal N.		[lower cord]	Brachial Plexus [Five]
	{	" " Ninth.	9	9. Second " "			
		N. Dorsal First.	10	10. Third " "			
		" " Second.	11	11. Fourth " "			
	{	" " Third.	12	12. Fifth " "			
		" " Fourth.	13	13. Sixth " "			
		" " Fifth.	14	14. Seventh " "			
		" " Sixth.	15	15. Eighth " "			
Intercostals [Ten]	{	" " Seventh.	16	16. Ninth " "			
		" " Eighth.	17	17. Tenth " "			
		" " Ninth.	18	18. Eleventh " "			
		" " Tenth.	19	19. Twelfth " "			
	{	" " Eleventh.	20	20. First Lumbar N.			
		" " Twelfth.	21	21. Second " "			
		N. Lumbar First.	22	22. Third " "			
		" " Second.	23	23. Fourth " "			
Plexus, Lumbar [Five]	{	" " Third.	24	24. Fifth " "			
		" " Fourth.	25	25. First Sacral N.			
		" " Fifth.	26	26. Second " "			
		N. Sacral First.	27	27. Third " "			
[Lumbo- Plexus, Sacral]	{	" " Second.	28	28. Fourth " "			
		" " Third.	29	29. Fifth " "			
		" " Fourth.	30	30. First Coccyg. N.			
		" " Fifth.	31	31. Second " "			
	{	N. Coccyg. First.	31				

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A REVIEW OF THE PROGRESS OF NORTH AMERICAN INVERTEBRATE PALÆONTOLOGY FOR 1883.

BY J. B. MARCOU.

I HAVE taken up the task of preparing this brief review at the request of Dr. C. A. White, who, for several years past, has prepared a similar one, but whose numerous avocations do not leave sufficient time for continuing his publication of such a review.

During the latter part of the year invertebrate palæontology

has lost two of its most eminent students, Professor Oswald Heer, of Zurich, whose descriptions of the cretaceous dicotyledons of Nebraska and of the arctic flora, assure him a prominent place among the pioneers of American palæontology; and Mr. Joachim Barrande, whose publications of a number of our older fossils also entitle him to a prominent place in the history of the progress of North American palæontology.

At the meeting of the American Association for the Advancement of Science for 1883, a number of palæontological papers were read, of which brief notices appeared in *Science*, Vol. II, No. 31. Professor James Hall read a paper entitled "Preliminary note on the microscopic shell structure of the paleozoic Brachiopoda." Professor J. W. Dawson read a paper on "Rhizocarps in the paleozoic period." Mr. E. W. Claypole read a paper on "Renssælia and a fossil fish from the Hamilton group of Pennsylvania," he also read a paper on "A large crustacean from the Catskill group of Pennsylvania."

H. Booth, in the *American Journal of Science*, for November, has a note on the "Discovery of Utica slate Graptolites on the west side of the Hudson."

S. Calvin, in the *Amer. Journ. of Science*, for June, published an article "On the fauna found at Lime creek, Iowa, and its relation to other geological faunas." In this article he points out a few errors made by Professor H. S. Williams, in the *Amer. Journ. of Science*, for February, on "The fauna at the base of the Chemung group, in New York." Mr. Calvin, while admitting the similarity of the Lime creek fauna with that of High Point, N. Y., considers their equivalency very doubtful.

John M. Clarke, in the *Amer. Journ. of Science*, for February, published a paper on "New discoveries in Devonian crustacea."

E. W. Claypole, in the *AMERICAN NATURALIST*, Vol. XVII, No. 3, published a paper "On the occurrence of fossiliferous strata in the lower Ponent (Catskill) group of Middle Pennsylvania."

J. W. Dawson, in the *Canadian Naturalist and Quarterly Journal of Science*, Vol. x, New Series, No. 7, has a "Preliminary notice of new fossils from the Lower Carboniferous limestones of Nova Scotia and Newfoundland," in which there are descriptions of six new species from Nova Scotia, and of three from Newfoundland. In No. 8, of the same paper, Professor Dawson has a "Notice of graptolites of the Quebec group, collected by Mr. James Richardson for the Peter Redpath museum." In the *Trans.*

of the Royal Soc. Canada, on May 23d, 1883, he presented a paper on the "Cretaceous and tertiary floras of British Columbia, and the Northwest territory," illustrated by eight quarto plates; he mentions the occurrence of a few plants from the Ft. Pierre group, which are apparently different from a flora found in the same group on the Upper Missouri by Mr. Lester F. Ward in 1883, and yet unpublished.

Walter F. Ferrier, at the fourth meeting of the Natural History Society of Montreal, session 1882-1883 (published in the *Canadian Naturalist and Quarterly Journal of Science*, Vol. x, New Series, No. 8), read his "Notes on a fossil track from the Potsdam sandstone of Northern New York State," and Dr. Dawson said that the impressions belonged to the genus *Gyrichnites*, proposed by J. F. Whiteaves for similar impressions from the Erian of Gaspé.

Wm. F. E. Gurley published his "Bulletin, No. 1, New Carboniferous Fossils;" this is a private publication, apparently printed for private circulation—the descriptions are very indifferent, and the absence of any figures renders it difficult to say whether his species are new or not. It would be well for Mr. Gurley, if he wishes his species to be recognized, to seek publication through some of the regular channels, and to accompany his descriptions with proper illustrations.

Angelo Heilprin, in the Proc. Philadelphia Acad. of Nat. Sciences, published a "Note on a collection of fossils from the Hamilton (Devonian) group of Pike Co., Pennsylvania." This is a list of species and genera identified by Professor Heilprin in a collection made by Drs. E. Hine and J. Holt, and is welcome as a contribution to our knowledge of the palæontology of a State, concerning which we know comparatively little.

Indiana.—The twelfth report of the State geologist, Mr. John Collett, contains fourteen plates of the Van Cleve fossil corals, which are on the whole very creditable productions; they were reviewed by Professor James Hall, who also republishes here fourteen plates of his own corals, most of which are referred to as having been published in the advance sheets of the thirty-fifth annual report of the New York State Museum of Natural History (which has not yet appeared), but five of the species were unpublished. The Spergen Hill Brachiopoda, published by R. P. Whitfield, in the Bulletin No. 3, of the Amer. Museum of Nat. Hist., have also been reproduced here.

Illinois.—The seventh volume of the geological survey of Illinois contains descriptions of fossil invertebrates by A. H. Worthen, and S. A. Miller, and by Chas. Wachsmuth, and W. H. Barris, illustrated by five plates, together with an article on a new genus and species of Blastoids, with observations upon the structure of the basal plates in Codaster and Pentremites by Chas. Wachsmuth, and descriptions of some new Blastoids from the Hamilton group by W. H. Barris, in which four new species are described. The crinoids described are mostly from the Lower Carboniferous, being from the Keokuk, Warsaw, Chester, and St. Louis groups, with the exception of two or three species from the Upper Carboniferous.

U. P. James, on April 16th, published the seventh number of his "Palæontologist," with illustrated descriptions of three new species of fossil corals from the Cincinnati group of Ohio and Kentucky. In the Journal of the Cincinnati Society of Natural History, Vol. vi, December, he published "Descriptions of fossils from the Cincinnati group," illustrated by one plate, No. x; only two species are described.

Leo Lesquereux, in the proceedings of the U. S. National Museum, Vol. v, pp. 443-449, has published a "Contribution to the Miocene flora of Alaska," illustrated by five plates, vi to x, containing descriptions and figures of some new species, with an enumeration of some species already described, but not yet known in the flora of Alaska.

S. A. Miller, in the *Amer. Journ. of Science*, for August, published a "Response to the remarks of Messrs. Wachsmuth and Springer on the genera Glyptocrinus and Reteocrinus. In the Journal of the Cincinnati Society of Natural History, Vol. vi, December, 1883, he published an article entitled "Glyptocrinus re-defined and restricted, Gaurocrinus, Pycnocrinus, and Compsocrinus established, and two new species described." This article is illustrated by one lithographic plate of indifferent execution.

John Mickleborough, in the Journal of the Cincinnati Society of Natural History, for October, Vol. vi, published an article on the "Locomotive appendages of Trilobites." The specimen described is of great interest, and corroborates the evidence given by the Canadian Asaphus, described by Mr. E. Billings; unfortunately nothing is proven with relation to the oral appendages and branchiæ. The plates or figures, and a portion of the text were republished in the *AMERICAN NATURALIST*, for December.

J. S. Newberry, in the Proceedings of the U. S. National Museum, Vol. v, pp. 502-514, published "Brief descriptions of fossil plants, chiefly tertiary, from Western North America." No illustrations accompany these descriptions of fossil plants, mostly collected by Dr. F. V. Hayden, though many were collected by Professor T. Condon, by Professor J. J. Stevenson and I. C. Russell. Fuller descriptions with illustrations will appear in a volume which is to form one of the reports of the U. S. Geological Survey.

New York.—The second part of Vol. v of the Palæontology of New York, by James Hall, has appeared. It contains descriptions and illustrations of the Gastropoda, Pteropoda and Cephalopoda of the Upper Helderberg, Hamilton, Portage, and Chemung groups, illustrated by a volume of 113 very good plates. Professor Hall has also published a few copies of the plates of part first, of Vol. v, of the Palæontology of New York: "Lamellibranchiata, plates and explanations." There are twenty pages of explanations, and eighty plates of very good drawings, especially those drawn by J. H. Emerton, of Lamellibranchiate shells from the Upper Helderberg, Hamilton, Chemung, and Waverly groups, Professor Hall still retaining the latter group in the Devonian. "The author has been allowed to purchase, from the Secretary of State, 100 copies of the plates already lithographed, for this volume, which are published in this form in order to make them available for the use of scientific institutions and students in palæontology. The text and additional plates of the volume, whenever published, will be sent to the parties receiving this portion of the work."

S. H. Scudder, in the Proceedings of the American Academy of Arts and Sciences, presented on October 10th, a paper on the "Fossil white ants of Colorado from Florissant;" six new species and one new genus are described; and Mr. Scudder argues that their presence at Florissant is indicative of a much warmer climate than the locality now enjoys.

R. E. C. Stearns, in the AMERICAN NATURALIST, Vol. xvii, No. 10, published an illustrated paper "On the shells of the Colorado desert and the region farther east."

E. O. Ulrich, in the Journal of the Cincinnati Soc. of Nat. Hist. for April, 1883, No. 1, p. 82, and for July, 1883, No. 2, p. 148, published his "American palæozoic Bryozoa." (Continued from Vol. v, 1882, p. 297.)

The twelfth annual report of the U. S. Geological and Geographical Survey of the Territories, by F. V. Hayden, contains "Contributions to invertebrate palæontology," Nos. 2-8, by Dr. C. A. White, an author's edition of which appeared in (July) 1880. It also contains a brief article on the "Palæontology of the Florissant basin," by S. H. Scudder, which is a reprint with additions and illustrations of the article published in the Bull. of the Survey, Vol. vi, Art. xi. It also includes a monograph of the North American Phyllopod Crustacea, in which the fossil Phyllopoda and Phyllocarida are enumerated.

Charles Wachsmuth and Frank Springer, in the *Amer. Journ. of Science*, for April, published "Remarks on *Glyptocrinus* and *Reteocrinus*, two genera of Silurian crinoids." The same authors, in the November number of the same journal, published an article on "*Hybocrinus*, *Hoplocrinus*, and *Bærocrinus*."

M. E. Wadsworth, in *Science*, Vol. i, p. 422, published a note on "Molluscan rock-boring."

C. D. Walcott, in the advance sheets of the thirty-fifth report of the N. Y. State Museum of Natural History, published "Descriptions of new species of fossils from the Trenton group of New York," illustrated by one plate, No. xvii. In the *Amer. Journ. of Science*, he published a note on the "Injury sustained by the eye of a trilobite at the time of the molting of the shell." In *Science*, Vol. ii, No. 46, p. 808, the same author published "Fresh-water shells from the palæozoic rocks of Nevada." This is a brief illustrated note of three new species, and one new genus of shells from the carboniferous strata of Nevada.

L. F. Ward, in *Science*, Vol. i, p. 358, published a brief article on "Plant life, past and present."

C. A. White, in the *AMERICAN NATURALIST*, Vol. xvii, No. 6, published his "Progress of invertebrate palæontology in the U. S. for the year 1882." In the *Amer. Journ. of Science*, for March, he published "Late observations concerning the molluscan fauna and the geographical extent of the Laramie group;" in the same journal for August, he published a note on the "Commingling of ancient faunal and modern floral types in the Laramie group." Dr. White has also published, in the annual report of the U. S. Geological Survey, 1881-1882, separately paged, with 32 plates, "A review of the non-marine fossil mollusca of North America." It is an important and lasting contribution to North American pal-

æontology in a very useful form. In his preliminary remarks, Dr. White calls attention to his original view of the origin of non-marine mollusks, through the land-locking of marine types, and derives our present non-marine fauna of the Mississippi drainage system directly from the fauna of the old Laramie sea. In the Proceedings of the U. S. National Museum, Vol. v, pp. 94-99, Dr. White published, "New molluscan forms from the Laramie and Green River groups, with discussion of some associated forms heretofore known," illustrated by two plates, Nos. III and IV; these descriptions already appeared in his review of the non-marine fossil mollusca of North America. In the same publication, pp. 99-102, he has also "The molluscan fauna of the Truckee group, including a new form," illustrated by one plate, No. v; this also appeared in the review of non-marine mollusca.

J. F. Whiteaves, in the *Canadian Naturalist and Quarterly Journal of Science*, Vol. x, new series, No. 7, published a note on the "Occurrence of *Siphonotreta scotica* (Davidson), in the Utica formation, near Ottawa, Ontario." This paper was read before the American Association for the Advancement of Science, Montreal, 1882.

R. P. Whitfield, in the *Amer. Journ. of Science*, for May, published "Observations on the fossils of the metamorphic rocks of Bernardstown, Mass."

H. S. Williams read before the American Philosophical Society, April 20th, 1883, a paper on "A crinoid with movable spines." In the Proceedings of the Academy of Natural Science of Philadelphia, Part I, 1882, p. 17, Professor Williams published "New crinoids from the rocks of the Chemung period of New York State," illustrated by one plate, No. 1. In the *Amer. Journ. of Science*, for February, Professor Williams published a paper on the "Fauna at the base of the Chemung group in New York," in which he gives a list of species found at High Point, Naples, N. Y., and comments on their similarity to the fauna of Lime creek, Iowa, referring it to the Kinderhook group, and argues that they are equivalent, and that as long as the Chemung is to be retained in the Devonian, the western beds should also be regarded as Devonian; he has apparently overlooked Professor S. Calvin's article in the *Amer. Journ. of Science*, 1878, Vol. xv, p. 460, in which the species mentioned are recorded as occurring also at the base of the Devonian in Iowa, showing them to have

a wide vertical range, and bearing out Dr. White's view, that the Devonian of Iowa belongs to a single epoch, probably the Hamilton. In the *Amer. Journ. of Science*, for April, p. 311, Professor Williams, in a note, acknowledged that he was wrong in speaking of the rocks of Lime creek, Iowa, as referred by Western geologists to the Kinderhook group, but maintained his view, that its fauna was represented in N. Y., at the base of the Chemung.

Wisconsin.—Vol. IV, Part III, of the Geological Survey of Wisconsin, contains descriptions of fossils, by R. P. Whitfield, illustrated by 27 plates of very good figures; some of the species are new, but most of them have already been described; the fossils described are not offered as a complete representation of the fauna of the several geological horizons of the State, but only as a few of the more prominent known species, together with some of the most characteristic new ones of the several localities from which they have been obtained; the volume also contains a general list of the fossils recognized within the State, including those described, and showing the formation in which they occur, which are the Potsdam, Lower Magnesian, Trenton, Galena, Hudson River, Niagara, Guelph, Lower Helderberg, and Hamilton. Professor Whitfield calls attention to the marked differentiation of the species of the Potsdam in different localities, according to the change in the lithological character of the matrix.

The first volume of the Wisconsin Geological Survey, which has been the last to appear, also contains a list of Wisconsin fossils, and in the general geology contained in the report, there are a large number of figures, many of which are reproductions of Professor Whitfield's plates; the other figures are compiled from various sources, and answer their purpose for a school text-book fairly well.

If those who notice them, will kindly call my attention to any omissions, I will insert them in next year's review, as it is intended to make this record as complete as possible.

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EDITORS' TABLE.

EDITORS: A. S. PACKARD, JR., AND E. D. COPE.

— Professor Martin's address at the opening of the new biological institute at Baltimore, lately published in *Science*, calls attention emphatically to the lack of consideration and support